

PENDING CLAIMS

What follows is a complete list of claims currently pending in the application.

Claims 7, 13-14, 23, 27-32, 39, 51, and 53 are cancelled. Please amend claims 1, 8, 15, 18, 21, 24, 33, 38, 40, 42, 46, and 47 as shown below.

1. (Currently amended) A SONOS-type device comprising:
a tunneling dielectric,
a dielectric charge storage layer in contact with the tunneling dielectric, the
charge storage layer comprising a first dielectric film and a second dielectric
film, wherein the first and the second dielectric films are formed of different
materials; and
a blocking dielectric in contact with the charge storage layer; and
a semiconductor channel region in contact with the tunneling dielectric,
wherein the semiconductor channel region comprises polysilicon.
2. (Original) The SONOS-type device of claim 1 wherein the first or the second
dielectric film comprises a dielectric material with a dielectric constant greater
than or equal to 3.9.
3. (Original) The SONOS-type device of claim 1 wherein the first dielectric film
comprises silicon nitride, silicon dioxide, hafnium oxide, aluminum oxide,
zirconium oxide, or tantalum pentoxide.
4. (Original) The SONOS-type device of claim 3 wherein the first dielectric film
comprises silicon nitride and the second dielectric film comprises silicon dioxide.
5. (Original) The SONOS device of claim 1 wherein the charge storage layer further
comprises a third dielectric film.

6. (Original) The SONOS-type device of claim 5 wherein the first dielectric film and the third dielectric film are formed of the same material, and the second dielectric film is interposed between the first and third dielectric films.
7. (Cancelled)
8. (Currently amended) The SONOS-type device of claim 1 7 further comprising a gate electrode in contact with the blocking dielectric.
9. (Original) The SONOS-type device of claim 8 wherein the gate electrode comprises polysilicon.
10. (Original) The SONOS-type device of claim 8 wherein the gate electrode comprises tungsten.
11. (Original) The SONOS-type device of claim 8 wherein the device is a portion of a memory array.
12. (Original) The SONOS-type device of claim 11 wherein the memory array is a monolithic three dimensional memory array.
- 13-14. (Cancelled)
15. (Currently amended) The SONOS-type device of claim 1 7 wherein the device is a portion of a memory array.
16. (Original) The SONOS-type device of claim 15 wherein the memory array is a monolithic three dimensional memory array.
17. (Original) The SONOS-type device of claim 1 wherein the charge storage layer is between about 30 and about 200 angstroms thick.

18. (Currently amended) A SONOS-type device comprising:
a tunneling dielectric,
a dielectric charge storage layer in contact with the tunneling dielectric, the
charge storage layer comprising a first dielectric film and a second dielectric
film, wherein at least one of the first dielectric film and the second dielectric
film does not comprise silicon nitride; ~~and~~
a blocking dielectric in contact with the charge storage layer; and
a semiconductor channel region in contact with the tunneling dielectric,
wherein the channel region comprises polysilicon,
wherein the device is a portion of a monolithic three dimensional memory array.
19. (Original) The SONOS-type device of claim 18 wherein the first dielectric film
does not comprise silicon nitride.
20. (Original) The SONOS-type device of claim 19 wherein the first dielectric film
comprises a dielectric material with a dielectric constant greater than or equal to
3.9.
21. (Currently amended) The SONOS-type device of claim 20 wherein the first
dielectric film comprises ~~silicon dioxide~~, hafnium oxide, aluminum oxide,
zirconium oxide, or tantalum pentoxide.
22. (Original) The SONOS-type device of claim 21 wherein the second dielectric film
comprises silicon nitride.
23. (Cancelled)
24. (Currently amended) The SONOS-type device of claim 18 ~~23~~ further comprising
a gate electrode in contact with the blocking dielectric.

25. (Original) The SONOS-type device of claim 24 wherein the gate electrode comprises polysilicon.

26. (Original) The SONOS-type device of claim 24 wherein the gate electrode comprises tungsten.

27-32. (Cancelled)

33. (Currently amended) A SONOS-type device comprising:

a tunneling dielectric;

a blocking dielectric;

a first dielectric charge storage film in contact with the blocking dielectric comprising a first material; and

a second dielectric charge storage film comprising a second material, the second charge storage film in contact with the first charge storage film,

wherein the second material and the first material are not the same material, and

wherein the first charge storage film and the second charge storage film are

disposed between the tunneling dielectric and the blocking dielectric,

wherein the SONOS-type device is a TFT device.

34. (Original) The SONOS-type device of claim 33 wherein the first material comprises a dielectric material with a dielectric constant greater than or equal to 3.9.

35. (Original) The SONOS-type device of claim 34 wherein the first material is silicon nitride, silicon dioxide, hafnium oxide, aluminum oxide, zirconium oxide, or tantalum pentoxide.

36. (Original) The SONOS-type device of claim 35 further comprising a third charge storage film in contact with the second charge storage film.

37. (Original) The SONOS-type device of claim 36 further comprising a fourth charge storage film in contact with the third charge storage film, the first and third charge storage films comprising the first material, and the second and fourth charge storage films comprising the second material.

38. (Currently amended) A SONOS-type device comprising:
a tunneling dielectric;
a blocking dielectric;
a first dielectric charge storage film disposed between the tunneling dielectric and the blocking dielectric; and
a second dielectric charge storage film disposed between the tunneling dielectric and the blocking dielectric,
wherein at least one of the first charge storage film and the second charge storage film does not comprise silicon nitride, and
wherein no material disposed between the tunneling dielectric and the blocking dielectric is a conductor or a semiconductor; and
a channel region in contact with the tunneling dielectric,
wherein the channel region is polysilicon.

39. (Cancelled)

40. (Currently amended) The SONOS-type device of claim 38 ~~39~~ further comprising a gate electrode in contact with the blocking dielectric.

41. (Original) The SONOS-type device of claim 40 wherein the gate electrode is above the channel region.

42. (Cancelled)

43. (Original) The SONOS-type device of claim 38 further comprising a gate electrode in contact with the blocking dielectric.

44. (Original) The SONOS-type device of claim 38 wherein:
the first charge storage film is a first material,
the second charge storage film is a second material,
and the first material and the second material are not the same material.
45. (Original) The SONOS-type device of claim 38 wherein the first material is a dielectric material with a dielectric constant greater than or equal to 3.9.
46. (Currently amended) The SONOS-type device of claim 45 wherein the first material is ~~silicon nitride, silicon dioxide~~, hafnium oxide, aluminum oxide, zirconium oxide, or tantalum pentoxide.
47. (Currently amended) A method for making a SONOS-type memory cell, said method comprising the steps of:
depositing ~~forming~~ a polycrystalline semiconductor channel region;
forming a tunneling dielectric;
forming a blocking dielectric;
forming a gate electrode;
forming a first charge storage film between the tunneling dielectric and the blocking dielectric; and
forming a second charge storage film in contact with the first charge storage film, wherein at least one of the first charge storage film and the second charge storage film is not silicon nitride; and
wherein the first charge storage film is in contact with the blocking dielectric, wherein the memory array is a monolithic three dimensional memory.
48. (Original) The method of claim 47 wherein the channel region is over the gate electrode.

49. (Original) The method of claim 47 wherein the gate electrode is over the channel region.
50. (Original) The method of claim 47 wherein the SONOS-type memory cell is a portion of a memory array.
51. (Cancelled)
52. (Original) The method of claim 47 wherein the first charge storage film or the second charge storage film is between about 10 and about 190 angstroms thick.
53. (Cancelled)
54. (Original) A monolithic three-dimensional memory array comprising a plurality of SONOS-type memory cells, each cell comprising:
a tunneling dielectric,
a dielectric charge storage layer in contact with the tunneling dielectric, the charge storage layer comprising a first dielectric film and a second dielectric film, wherein at least one of the first dielectric film and the second dielectric film does not comprise silicon nitride; and
a blocking dielectric in contact with the charge storage layer,
wherein the memory array comprises at least two levels of SONOS-type memory cells, one level formed vertically over the other.
55. (Original) A memory cell comprising:
a channel region; and
a tunneling oxide grown by an in situ steam generation process, the tunneling oxide in contact with the channel region,
wherein the memory cell is a portion of a monolithic three dimensional memory array comprising at least two levels of memory cells, one level formed vertically over the other.

56. (Original) The memory cell of claim 55 further comprising:
a blocking oxide; and
a dielectric charge storage layer in contact with the blocking oxide and the tunneling oxide.
57. (Original) The memory cell of claim 56, wherein the dielectric charge storage layer comprises:
a first dielectric charge storage film comprising a first material; and
a second dielectric charge storage film comprising a second material, wherein the first material and the second material are not the same material.
58. (Original) The memory cell of claim 57 wherein the first material is silicon nitride, silicon dioxide, hafnium oxide, aluminum oxide, zirconium oxide, or tantalum pentoxide.
59. (Original) The memory cell of claim 55 wherein the in situ steam generation process is performed at a temperature of between about 750 degrees Celsius and about 1050 degrees Celsius.

CLAIM AMENDMENTS: DISCUSSION

Claim 1 has been amended to recite a SONOS-type device comprising: a tunneling dielectric, a dielectric charge storage layer in contact with the tunneling dielectric, the charge storage layer comprising a first dielectric film and a second dielectric film, wherein the first and the second dielectric films are formed of different materials; a blocking dielectric in contact with the charge storage layer; and a semiconductor channel region in contact with the tunneling dielectric, wherein the semiconductor channel region comprises polysilicon. As amended, claim 1 now includes the limitations of claims 7 and 13, which have been cancelled. Claims 8 and 15 have been amended to depend from claim 1 rather than from claim 7 from which they formerly depended.

Claim 18 has been amended to recite a SONOS-type device comprising: a tunneling dielectric, a dielectric charge storage layer in contact with the tunneling dielectric, the charge storage layer comprising a first dielectric film and a second dielectric film, wherein at least one of the first dielectric film and the second dielectric film does not comprise silicon nitride; a blocking dielectric in contact with the charge storage layer; and a semiconductor channel region in contact with the tunneling dielectric, wherein the channel region comprises polysilicon, wherein the device is a portion of a monolithic three dimensional memory array. As amended, claim 18 now includes the limitations of claims 23 and 29, which have been cancelled, as well as those of claims 27 and 28 or of analogous claims 31 and 32, which have also been cancelled. Claims 24 and 31 have been amended to depend from claim 18 rather than from claim 23 from which they formerly depended.

Claim 33 has been amended to recite a SONOS-type device comprising: a tunneling dielectric; a blocking dielectric; a first dielectric charge storage film in contact with the blocking dielectric comprising a first material; and a second dielectric charge storage film comprising a second material, the second charge storage film in contact with the first charge storage film, wherein the second material and the first material are not the same material, and wherein the first charge storage film and the second charge storage film are disposed between the tunneling dielectric and the blocking dielectric, wherein the SONOS-type device is a TFT device. Support for this amendment can be found, *inter alia*, at paragraph [0033] of the specification.

Claim 38 has been amended to recite a SONOS-type device comprising: a tunneling dielectric; a blocking dielectric; a first dielectric charge storage film disposed between the tunneling dielectric and the blocking dielectric; and a second dielectric charge storage film disposed between the tunneling dielectric and the blocking dielectric, wherein at least one of the first charge storage film and the second charge storage film does not comprise silicon nitride, and wherein no material disposed between the tunneling dielectric and the blocking dielectric is a conductor or a semiconductor; and a channel region in contact with the tunneling dielectric, wherein the channel region is polysilicon. This amendment is analogous to the amendments made to claims 1 and 18, and has the same support.

Claim 47 has been amended to recite a method for making a SONOS-type memory cell, said method comprising the steps of: depositing a polycrystalline semiconductor channel region; forming a tunneling dielectric; forming a blocking dielectric; forming a gate electrode; forming a first charge storage film between the

tunneling dielectric and the blocking dielectric; and forming a second charge storage film in contact with the first charge storage film, wherein at least one of the first charge storage film and the second charge storage film is not silicon nitride; and wherein the first charge storage film is in contact with the blocking dielectric, wherein the memory array is a monolithic three dimensional memory. Amended claim 47 includes the limitation of original claim 51, which has been cancelled. Additional support for this amendment can be found, *inter alia*, at paragraph [0033] of the specification.

None of these claim amendments constitutes new matter.